Hall **R**esearch **T**echnologies, Inc

1163 Warner Ave.
Tustin, CA 92780
Phone: (714) 641-6607
Fax: (714) 641-6698

User's Manual

Model MC4-H2
Dual Head KVM Switch
Control 4 Dual Video output PC's from one set of
monitors, keyboard and mouse

April 11, 2006

UMA1091 Rev. 1

Table of Contents

Introduction

MC4-H2 allows two monitors, 1 keyboard, and 1 mouse to control 4 different PC's or servers. By chaining up to 3 *MC4-H2's,* up to 12 PC's can be controlled

General

The *MC4-H2* switches both video outputs to display the selected PC's video outputs at full resolution using buffered and wideband video circuits. It also routes the signals from the mouse and keyboard to the selected pc, while, at the same time, emulating a keyboard and a mouse for the unselected PCs so that they can detect and communicate with a "virtual" mouse and keyboard in order for the PCs to operate normally.

Upon power up the *MC4-H2* will locate and identify the type of mouse plugged into the mouse port and initialize that mouse. The same will then be done for the keyboard.

The power supply included with the *MC4-H2* will power up to 3 *MC4-H2* units. Only 1 power supply is need to power 3 *MC4-H2* units.

There are 3 ways the *MC4-H2* can switch from one PC to another. The first is through the buttons located on the front panel of the *MC4-H2*. The second is through a hot-key sequence from the keyboard and the third is through RS-232 control.

The unit supports 2-button, 3-button, and scroll mice. 4-button mice and above are not supported.

When the *MC4-H2* is powered up or reset, the PC that was last selected will be selected by default.

There are two different types of LEDs on the front panel. When the LED labeled PWR is illuminated then the PC attached to that port is powered on. When the LED labeled SEL is illuminated, then the PC attached to that port is the selected PC. The selected PC is the PC currently being controlled by then keyboard and mouse.

Supported Systems and Peripherals

- All PC compatible systems and notebooks
- Standard PS/2 and AT Keyboards (Legacy AT keyboards may require connector adapters)
- Standard (2-button) and wheel (3-button) (e.g. Microsoft Intellimouse) mice. 4-button mice are not supported.
- VGA, XGA, UXGA video resolutions to 1600x1200 at 50 to 85 Hz refresh rate.

Features

- Switches two video screens from each PC to user's console
- Extremely reliable operation with proven firmware for no keyboard or mouse lock ups
- Video outputs are terminated and buffered with wide bandwidth video amplifiers for sharp and crisp image
- Quick and easy switching between PC's
- LED indicators of PC power status and PC selected
- Comprehensive PS/2 protocol emulation for keyboard and mouse for all PC's at all times
- Hot-swapping capabilities of the PC's and the devices
- Returns to last selected PC after power off or reset
- Small and compact design
- Only one cable needed to connect to each PC
- Designed and manufactured in the USA
- RS-232 Control
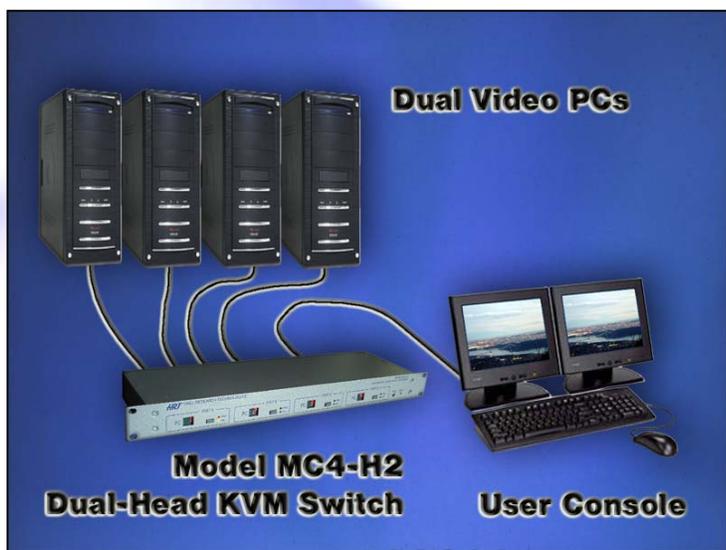
Setup
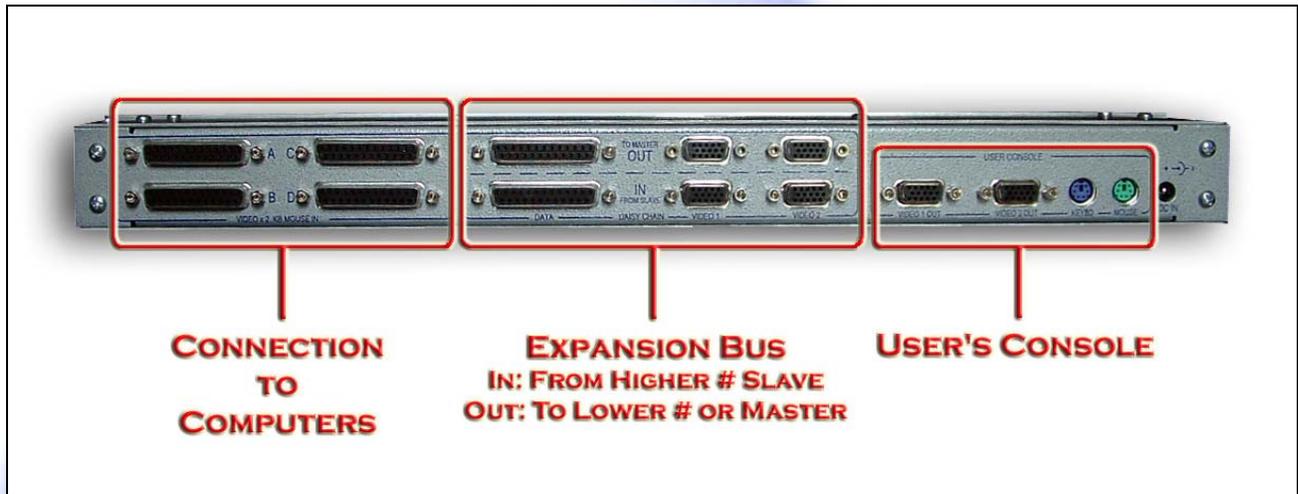
**FIGURE 1** *MC4-H2* Connector Functions on Rear Panel
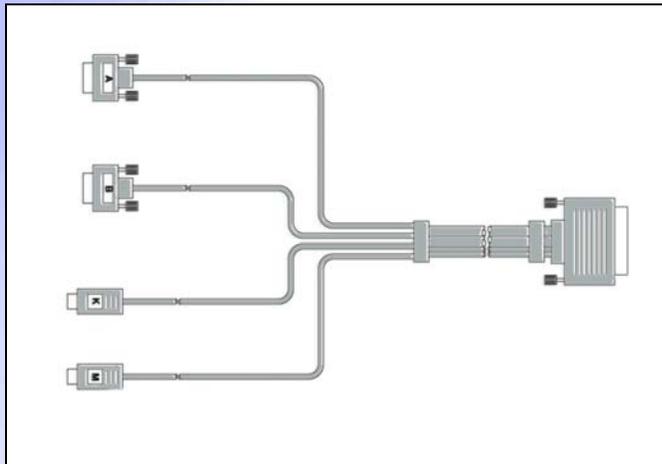
FIGURE 2 *CA-100872 Cable for connection to each PC*

1. Use the special CA10087-6,or -10 (4-in-1) cable to connect PC A to the *MC4-H2*. The DB25 connector plugs into the *MC4-H2*. The keyboard connector, of the CA10087 cable is either labeled "K" or is purple and plugs into the keyboard port on PC A. The mouse connector, of the CA10087 cable is either labeled "M" or is green and plugs into the mouse port of PC A (it is best to turn off all PC's when you are hooking them to the *MC4-H2*).

   The input cable s are available in two lengths of 6 ft and 10 ft. CA10087-6 or –10 (sold separately)

2. Repeat step 1 for the remaining PC's. Note: only 4 PC's may be connected to each *MC4-H2* simultaneously. Not all 4 PC ports need to be used for the *MC4-H2* to work properly.

3. Connect a mouse to the mouse port of the master *MC4-H2*. The Master unit is the one with PC # 1 through 4

4. Connect a keyboard to the keyboard port of the master *MC4-H2*.

5. Plug in the power supply that comes with the *MC4-H2* to the unit and connect it to an AC outlet

6. Turn the PC's on

7. The keyboard and mouse may now be treated as a keyboard and mouse connected directly to the PC that is selected through the unit.

Operation

The keyboard and mouse will function no differently than if the keyboard and mouse were connected directly to the PC.

Switching

You can use of three ways to switch among the PCs.

The first way is to simply press the button for the desired PC on the front panel of the **MC4-H2**.

The second way to switch is through a hot-key combination from the keyboard. The hot-key combination is as follows.

Press and release: "Scroll Lock"

Press and release: "Scroll Lock"

Press and release: "01" or "02" or "03" or "04" If more than 1 **MC4-H2** are chained together then you can switch to the other pc's by pressing their corresponding 2 digit number "05" – "12"

The **MC4-H2** will now switch to the PC connected to the port corresponding to the number pressed.

There is a 2 second timeout between each hot key. This means that if the second Scroll Lock is not pressed within 2 seconds of the release of the first Scroll Lock, the sequence will be aborted and will not **MC4-H2**. The same situation applies to the number pressed after the release of the second Scroll Lock.

The third way to switch between PC's is the use of RS-232 serial control. Connect the supplied serial cable (Mini-stereo to DB9 Female) to the RS232 port on the front of the **MC4-H2** and the other end to a PC.

Baud Rate is 4800:

To switch to a PC send the following ASCII commands to the **MC4-H2**.

Sxx – where "xx" is the 2-digit number of the PC you wish to switch to

Example: S01 – switches to PC #1

By default, when switching, the **MC4-H2** will not switch to a port that does not have a powered PC. (i.e. the red PWR led is not on). This behavior however, can be changed via the Serial control.
The command to allow switching to a non-powered PC is: P1
The command to disallow switching to a non-powered PC is: P0
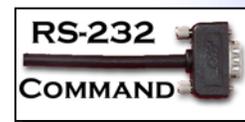
Setting the address of the MC4-H2

Each MC4-H2 needs to be assigned an address in order to function. The 3 different addresses are the following:
1. Master
2. Slave 1
3. Slave 2

There **must** be a Master unit for any mouse/keyboard/video communication and switching to take place.

The **MC4-H2** unit with the Master address will number the PC's attached to it, 1-4.
The **MC4-H2** unit with the Slave 1 address will number the PC's attached to it, 5-8.
The **MC4-H2** with the Slave 2 address will number the PC's attached to it, 9-12.

There are 2 ways to set the address of an MC4-H2.
1. Via the front panel push buttons
2. Via Serial control

Front Panel Push Buttons:

Hold down the buttons for port A and port D simultaneously for 3 seconds on the unit where you want to change the address. When you see the LED's begin to flash this indicates that the address can now be changed for this unit. Press any of the front

panel buttons to cycle the address from Master, to Slave 1, to Slave 2 and then back to Master. As the address cycles, you will see the port number on the front panel LED's changing between the following combinations:

    1 2 3 4   or   5 6 7 8   or   9 10 11 12

When you have the proper address selected, press and hold down simultaneously the buttons of port A and port D on the unit. When the LED's stop blinking, this will indicate that the address has been set. (about 3 seconds)

Serial Control:

You may only change the address of the *MC4-H2* unit that you are connected to via a serial cable. Send the following command to the *MC4-H2* to change the address of the box, which you are connected to via the serial cable.

Ax   - where "x*" is* the address you want this unit to have.

The address commands are "M" for Master, "1" for Slave 1, and "2" for Slave 2

    Examples:
        AM   - set this unit's address to Master (Ports 1-4)
        A1   - set this unit's address to Slave 1 (Ports 5-8)

RS-232 COMMAND
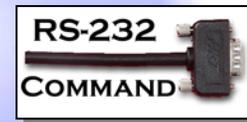
When an address is changed, that unit announces it's new address to any other *MC4-H2's* that it is connected to via the chain cable. If any unit already has this address, it will loose it's address to the unit that just changed addresses. Here is an example. Let's say you have two *MC4-H2's*. Call them Unit A and Unit B. Unit A is set as the Master and Unit B is set as the Slave 1. If you were to change the address of Unit B to the master, Unit A will have to give up it's address since Unit B has now taken the Master address. Unit A will now not have an address and the LED's will be blinking "00". Give Unit A an address by following the front panel method or the serial method.

Note: *If a unit has no address, the LED's are flashing "00", you will still need to hold down the buttons on port A and port D for 3 seconds and the press any front panel button to select a new address and then continue with the Front Panel address changing method.*

Stacking (Daisy-Chaining) of Multiple MC4-H2 Units

In order to connect two or more units to expand the number of PC's that you control, you need to order a Daisy-Chain Cable Set. Connect the **OUT** of the Slave #1 to the **IN** of the Master. If you have a 2nd slave connect the **OUT** of it to the **IN** of Slave #1. The Power Supply connected to the master unit will power up the Slave Units through the expansion port. However there is no damage if you connect supplies to the slaves and in fact it is recommended when you have 3 units.

FIGURE 3 *Stacking of MC4-H2 Units*

Hot Swapping Mice and Keyboards

Hot swapping is not recommended but may be successfully performed. You may unplug the mouse and/or the keyboard while the *MC4-H2* is powered up and PC's are connected and powered on. You may then plug in the same keyboard/mouse or a different keyboard/mouse and the *MC4-H2* will recognize the new keyboard/mouse.

Hot Swapping PC's

You may hot swap a PC while the *MC4-H2* is powered up only after that PC has been turned off. After the PC has been turned off, unplug the keyboard, mouse, and video connectors of the CA10087 (4-in-1) cable then plug them into the PC you wish to insert into the *MC4-H2* setup. Then power on the new PC.

Specifications

Dimensions

Width X Height X Depth	19 X 1-3/4 X 5-1/4 in Single Rack Unit (1RU) construction

Video

Max Resolution	1600 X 1200
Coupling	DC
Video Level	0.7 V p-p
Video Gain	1; double-terminated
Bandwidth	250 MHz
Drive	0 to 25 ft. on User Console

Keyboard

Connector:	Mini Din 6-pin Female
Type	All AT and Windows® compatible keyboards
Mode	All modes supported by the operating system
Communication	Bi-directional

Mouse

Connector	Mini Din 6-pin Female
Mouse Type	Any PS2 mouse or pointing device

Federal Communications Commission (FCC) Statement _____

This equipment generates, uses and radiates radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. This equipment has been designed to comply with the limits for a Class A computing device, pursuant to Part 15 of the FCC rules. Harmful interference when operated in a commercial environment. Operation of this equipment in a residential area is likely to cause interference, in which case the user, at his own expense, will be required to take whatever measures are necessary to correct the interference.

Hall Research Technologies, Inc.

1163 Warner Ave.
Tustin, CA 92780
Phone: (714) 641-6607   Fax:(714) 641-6698